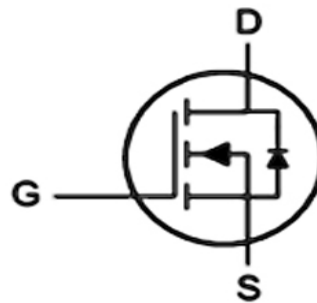## Description

This N-Channel MOSFET uses advanced trench technology and design to provide excellent $R_{DS(on)}$ with low gate charge. It can be used in a wide variety of applications.

Features

1) V_{DS}=100V,I_D=59A,$R_{DS(ON)}$<15mΩ @V_{GS}=10V
2) Low gate charge.
3) Green device available.
4) Advanced high cell denity trench technology for ultra $R_{DS(ON)}$.
5) Excellent package for good heat dissipation.

Absolute Maximum Ratings T_C=25℃,unless otherwise noted

Symbol	Parameter	Ratings	Units
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-Source Voltage	$\pm$25	V
I_D	Continuous Drain Current-	60	A
	Continuous Drain Current-T_C=100℃	42	
	Pulsed Drain Current[1]	240	
E_{AS}	Single Pulse Avalanche Energy	275	mJ
P_D	Power Dissipation	300	W
T_J, T_{STG}	Operating and Storage Junction Temperature Range	-55 to +175	℃

Thermal Characteristics

Symbol	Parameter	Ratings	Units
$R_{\theta JC}$	Thermal Resistance,Junction to Case[2]	0.85	℃/W
$R_{\theta JA}$	Thermal Resistance,Junction to Ambient	62.5	

Package Marking and Ordering Information

Part NO.	Marking	Package
RY59N10C	RY59N10C	TO-220

Electrical Characteristics T_C=25℃ unless otherwise noted

Symbol	Parameter	Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Sourtce Breakdown Voltage	V_{GS}=0V,I_D=250μA	100	---	---	V
I_{DSS}	Zero Gate Voltage Drain Current	V_{GS}=0V, V_{DS}=100V	---	---	1	μA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V, V_{DS}=0V	---	---	±100	nA
On Characteristics						
$V_{GS(th)}$	GATE-Source Threshold Voltage	V_{GS}=V_{DS}, I_D=250μA	3	4	5	V
$R_{DS(ON)}$	Drain-Source On Resistance	V_{GS}=10V,I_D=35A	---	14	15	mΩ
		V_{GS}=-4.5V,I_D=-12A	---	---	---	
G_{FS}	Forward Transconductance	V_{DS}=50V, I_D=35A	---	32	---	S
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}=25V, V_{GS}=0V, f=1MHz	---	3500	---	pF
C_{oss}	Output Capacitance		---	400	---	
C_{rss}	Reverse Transfer Capacitance		---	250	---	
R_g	Gate Resistance	V_{DS}=0V,V_{GS}=0V,f=1MHz	---	---	---	Ω
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DS}=50V, V_{GS}=10V,R_{GEN}=6.8Ω	---	23	---	ns
t_r	Rise Time		---	16	---	ns
$t_{d(off)}$	Turn-Off Delay Time		---	65	---	ns
t_f	Fall Time		---	35	---	ns
Q_g	Total Gate Charge	V_{GS}=10V, V_{DS}=50V, I_D=28A	---	75	---	nC
Q_{gs}	Gate-Source　Charge		---	16	---	nC
Q_{gd}	Gate-Drain "Miller" Charge		---	26	---	nC
Drain-Source Diode Characteristics						
V_{SD}	Source-Drain Diode Forward Voltage[3]	V_{GS}=0V,I_S=30A	---	0.85	1.3	V

Notes:

1 Limited by TJmax, starting TJ = 25°C, L = 0.5mH,RG = 25Ω, IAS = 28A, VGS =10V.

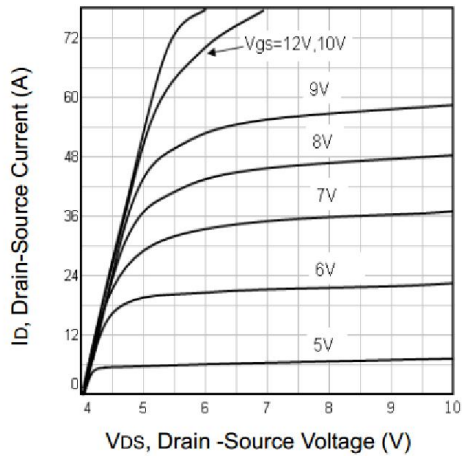## Typical Characteristics T_J=25℃ unless otherwise noted
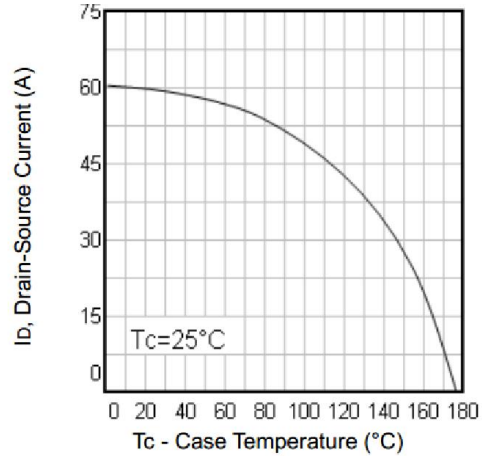
Fig1. Typical Output Characteristics
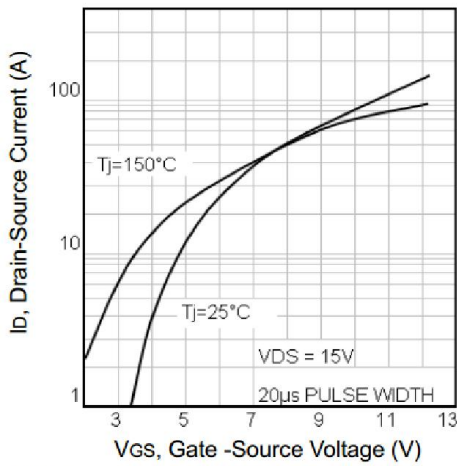
Fig2. Maximum Drain Current Vs.Case Temperature

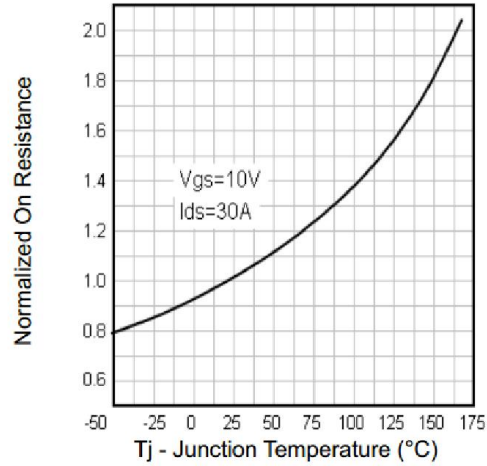Fig3. Typical Transfer Characteristics
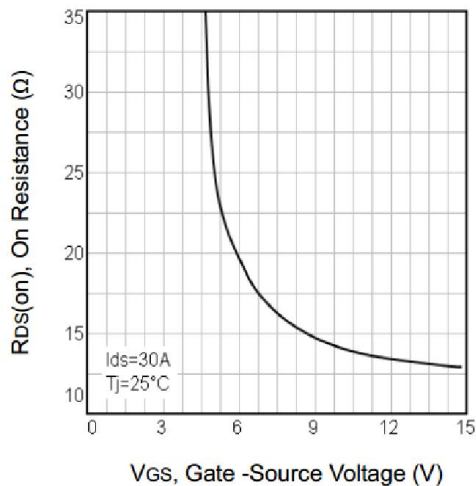
Fig4. Normalized On-Resistance Vs. Temperature
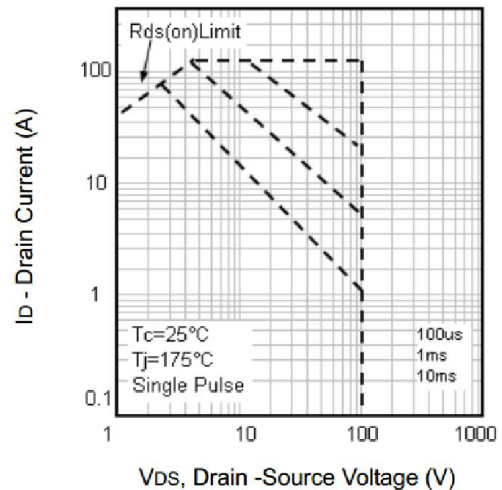
Fig5.Typical On Resistance Vs. Gate -Source Voltage
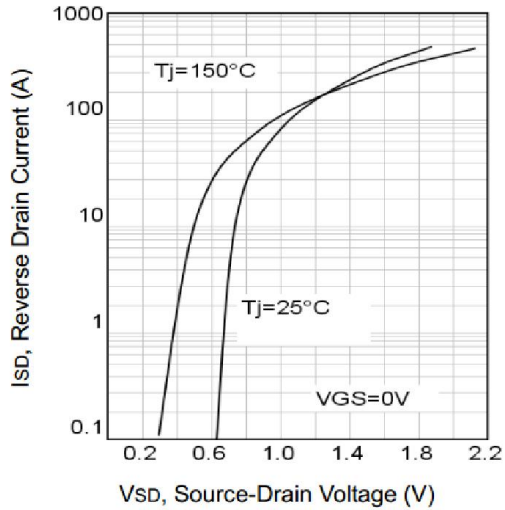
Fig6. Maximum Safe Operating Area
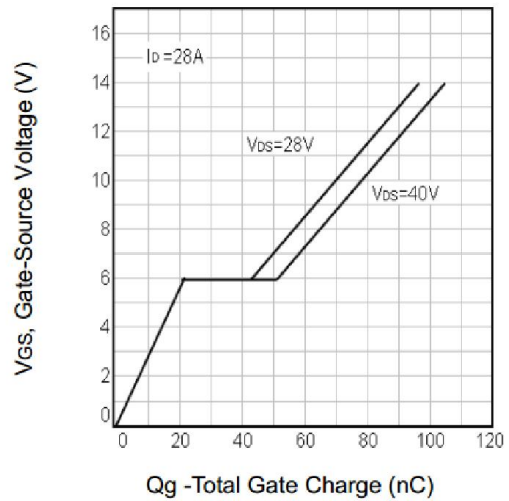
Fig7. Typical Source-Drain Diode Forward Voltage

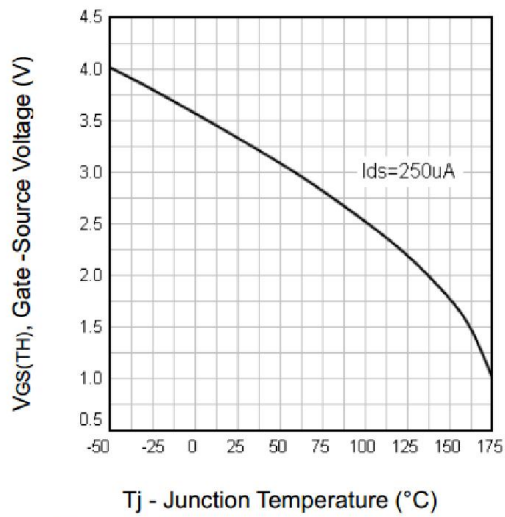Fig8. Typical Gate Charge Vs.Gate-Source Voltage
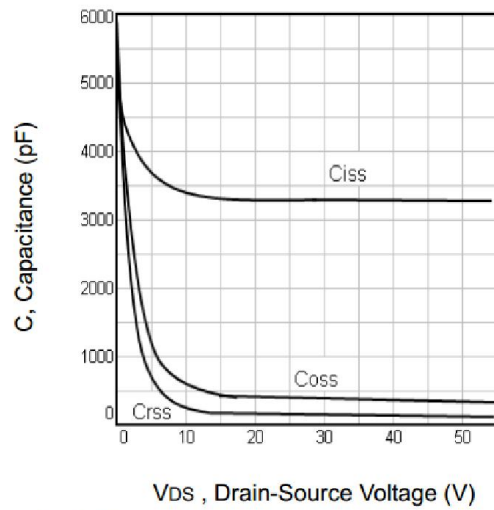

Fig9. Threshold Voltage Vs. Temperature

Fig10. Typical Capacitance Vs.Drain-Source Voltage